

PARRY (J. S.)

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CRANIOTOMY

AND THE

CÆSAREAN SECTION IN SMALL PELVES

WITH A

CONJUGATE DIAMETER OF TWO AND A HALF INCHES OR LESS.

BY JOHN S. PARRY, M.D.,

Attending Accoucheur to the Philadelphia Hospital, Vice-President of the Obstetrical Society
of Philadelphia, etc., etc.

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*D. A. C. Ward
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Jno. S. Parry.*

THE COMPARATIVE MERITS OF CRANIOTOMY AND THE CÆ-
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TER OF TWO AND A HALF INCHES OR LESS.

BY JOHN S. PARRY, M.D.,

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THE questions which it is proposed to discuss in this paper are among the gravest which can occupy the attention of the obstetric surgeon. In no branch of medicine do the problems which claim the consideration of the medical practitioner demand calmer judgment and nicer discrimination than those which are presented to the accoucheur for solution in such cases as these. Brought, as he is, to the bedside of suffering woman in the most trying moment of her existence, it is his duty at the best to undertake a most formidable operation. In the one case it is necessarily sacrificial, and in the other the risks are so grave that it can hardly be deemed conservative in its character.

No question in midwifery demands more careful investigation than this one, and its consideration has to be approached without parade or sentimentalism. Facts plain and unvarnished are demanded for its elucidation, and, singular as it may seem, these, so far as Cæsarean section is concerned, have been investigated with considerable care; but, as regards craniotomy in extreme pelvic deformity, the case is very different, as will become apparent as we progress in the discussion of this subject.

Some may question the propriety of making one clinical history the subject of a paper such as this is; but, as an excuse, it must be remembered that it rarely falls to the lot of one man to be called upon to deliver many women with pelves of two inches and a half or less in the conjugate diameter. It is more than probable that the statistics of the private practice of our most busy accoucheurs would prove very surprising.

Fleetwood Churchill, at the close of his busy and active life, tells us* that he has only performed craniotomy seven times in his private practice, which comprised the delivery of 2547 women, and of these only once for pelvic deformity after the failure of version.

These facts, with the hope that it may be the means of obtaining valuable information from others, seem to furnish a sufficient excuse for the preparation of this paper.

At the very outset of these remarks, it should be distinctly stated that nothing whatever will be said of minor deformities. Labor in women with a conjugate diameter of two and a half inches or less will alone claim our attention.

The following is the history of the patient who has been alluded to:

Narrow pelvis in a rachitic girl—Antero-posterior diameter one inch and a half—Embryotomy—Recovery.

Josephine Scott, aged about 24 years. Colored, single.

Previous history.—She was first pregnant some time before 1869, when she miscarried about the fifth month

* Dublin Jour. Med. Sci., June, 1872.

of gestation. The child was expelled without any difficulty, and no physician was with her until afterward.

In 1869, she again became pregnant. She fell into labor at full time in the obstetrical ward of the Philadelphia Hospital, under the care of my colleague, Dr. R. M. Girvin, who, in his notes of her delivery, states that the conjugate diameter of her pelvis is under two inches.

In January, 1872, she was again admitted to the lying-in wards of the Philadelphia Hospital. She could give no definite account of herself, and did not know how far her pregnancy had progressed. She is a dwarf in stature, being only fifty inches high. Has been profoundly rickety in her infancy, though the distortion of the extremities is not very remarkable. Her thighs are bent forward at their middle, and the tibiæ are moderately crooked. The length of the arm from the acromion to the end of the middle finger is $22\frac{1}{2}$ inches. From the upper margin of the great trochanter to the heel, following the curves of the limbs, is $24\frac{1}{2}$ inches. From the same point to the middle of the patella is 12 inches. From the middle of the patella to the outer malleolus is $12\frac{1}{2}$ inches.

The pelvis was carefully measured upon several occasions with the finger, and with both King's and Lumley Earle's pelvimeters. The antero-posterior diameter of the superior strait is only one inch and a half, while the transverse is a little less than four inches. The promontory of the sacrum projects so far forward that the pelvic cavity seems to be filled by a bony tumor. The right half of the pelvis is rather larger than the left. These facts were confirmed by repeated examinations.

The os uteri was very high up, almost out of reach of the examining finger, and was hard, irregular, and almost cicatricial in feeling.

The duration of gestation could not be determined with any certainty, because the girl could furnish no reliable information in regard to it, and the organs were so displaced on account of the pelvic deformity. She remained well until the 14th of March, 1872, when, upon consultation, Dr. Girvin and myself concluded to induce premature labor, not with the hope that a living child would be born, but simply to render the operation of craniotomy more easy. The os uteri was patulous, and a Barnes' dilator was introduced with great readiness; but it burst when distention was commenced. As no other was at hand, the operation had to be postponed. Dr. Girvin separated the membranes to a considerable extent, so that it was hoped that labor-pains would supervene. We therefore agreed to meet at 8 P.M. the same evening.

8 P.M.—Dr. Girvin was prevented from meeting me—a fact which I had great reason to regret, as his aid and advice would have been most serviceable, since he had already delivered the same woman at full time. During the afternoon, she had had pains at irregular intervals, and the os uteri was found to be dilating quite rapidly. It was too late to stop; so she was fully etherized, and the operation commenced in the presence of my colleague Dr. Duer, and Drs. Jenks, Ingham, the resident staff, and a number of medical students.

To complete the dilatation, the largest Barnes' dilator was introduced and fully distended; this, with the ether-

ization, occupied about forty-five minutes. The head was in the first position of the vertex, was very high up, and was reached with the greatest difficulty. At a quarter before 9 P.M., a pair of Smellie's scissors was passed up and the head was opened, while Dr. Duer steadied it by placing his hand over the mother's pubis. Perforation was effected with great difficulty, because the head was so very high and so movable. Notwithstanding it was supported by Dr. Duer, it would recede before the instrument, which, after being started, did its work almost without being guided by the finger. Hodge's perforator was tried, with the hope that it would prove better, but it was soon abandoned, and Smellie's resorted to again. Two openings were made and afterward united—both through the right parietal bone. The brain was thoroughly broken up, and washed out by a copious stream of water.

The crotchet was applied, and firm traction made both by Dr. Duer and myself; but the head could not be brought down or made to engage at the superior strait.

An attempt was now made to apply Braxton Hicks's cephalotribe. The first blade, the one to the left side, was easily applied, though this was the narrow half of the pelvis. The right blade was introduced with the greatest difficulty. It passed up sufficiently far, and locked easily enough, but this could not be effected without sacrificing the finger as a guide. There was not sufficient room in the cavity of the pelvis, with the first blade in position, to allow the right or second blade to pass along the fingers as a guide.

It was, therefore, deemed unjustifiable to resort to any

harsh measures to grasp the child's head. In spite of all that could be done, the second blade would enter the orifice made by the perforator, and, pushing the head before it, would carry this away from the other blade. An attempt was now made to seize the head with Simpson's cranioclast, but this likewise failed. Nothing was left us but to slowly pick the skull away with Meigs's embryulcia forceps. This was, indeed, an arduous task. Dr. Duer and myself worked away for the next hour, but neither of us was able to effect much. The pieces of bone removed were very small, only what were held in the grip of the forceps. The same was true of the cranioclast. It could only be applied with the utmost difficulty, and then tore out, bringing away a small piece of bone between the blades. The head could not be made to engage with the crotchet and combined pressure over the pubis.

These efforts were continued until after eleven o'clock. The woman had been under ether since eight. Her pulse was growing weak, her respirations were rapid and irregular, and her lungs filled with mucus, and the extremities cold. It was painfully evident to all present that the girl's condition was becoming very serious.

Another attempt was now made to apply the cephalotribe. The first blade was in position, and the introduction of the second was almost finished, when one of the gentlemen present leaned over me and whispered that he thought the first one had passed through the uterus into the peritoneal cavity. About the same time the handle of the instrument was thrust backward upon the perinæum, when the outline of the opposite extremity

was very clearly mapped out as it pressed the anterior abdominal wall forward. At the same instant I felt through the vagina what appeared to be a fold of intestine prolapsing a little to the left of the symphysis pubis. The situation was now sufficiently terrible. A careful examination, however, revealed the fact that the instrument was inside the uterus, which, with the anterior abdominal wall, was thin, and that the supposed fold of intestine was really the prolapsed cord. The handles of the cephalotribe were screwed together, but the instrument was not used as a tractor.

The cephalotribe was removed, but delivery could not be effected by either crotchet or cranioclast. For another hour, from twelve to one o'clock in the morning, we patiently worked away with Meigs's embryulcia forceps, pulling away little pieces of bone.

So slowly did the work go on, so rapidly did the patient's strength fail, that it seemed as if she must die undelivered. About half-past one o'clock, upon making a strong effort with the crotchet, the head was made to engage at the superior strait. We then succeeded in breaking away a few remaining portions of the frontal bone, when the chin was brought downward in the axis of the superior strait, and the head was seized with the cranioclast. With a severe effort it was dragged into the world, to the great relief of all present. The shoulders and pelvis were each pulled through the superior strait of the mother with considerable difficulty. The uterus contracted well; the placenta was removed in fifteen minutes, fortunately without any hemorrhage.

The woman had entered the eighth month of her

pregnancy. The cranium was totally destroyed, the base only being left. The tissues of the face were much compressed, the superior maxillary arch having been decomposed, and the eyes forced from their sockets by the cranioclast.

The woman was put to bed, stimulants given freely, with little hope of her recovery. For several days she was desperately ill with peritonitis, but she finally recovered. This was due in a great measure to the unremitting attention of Dr. Jameson, the resident accoucheur. A month later, the patient left the hospital in perfect health, and she assured me that she "did not mind having a baby, that it did not hurt her any."

No better example could have been selected to illustrate the difficulties of craniotomy. Before the induction of premature labor, the propriety of resorting to Cæsarean section was gravely discussed. Two facts had to be considered in deciding the question. Craniotomy can hardly be called a conservative obstetrical operation, since it necessarily sacrifices the life of the child, while the dangers to the mother are by no means trivial. In this instance, however, Dr. Girvin had proved that a mutilated child could be brought through the pelvis. The second operation could be performed under more favorable circumstances, since gestation was not completed. But the event proved this to be no small task. The memory of the six weary hours which were spent at that girl's bedside will not soon be effaced, and it will be a long time before I cease to remember the keen regret which I felt that we had not considered more fully the propriety of resorting to the Cæsarean operation

when we saw the symptoms of alarming prostration come on.

The statistics of this operation, so far as they are furnished us, go to show that the maternal mortality is high. Churchill* puts it down at one in five and a half. This statement is reiterated by Tyler Smith,† Hodge,‡ and others. If we examine cases as they are collected, this may appear to be the real mortality; and if so, we have a record which is indeed sad enough when compared with the loss of life in normal labor, which is about one in every 120 women.§ But it is to be remembered that the statistics of embryotomy are very fallacious. Drs. Hicks and Phillips|| have reanalyzed those from which the conclusions of Churchill, Smith, and probably those of others were drawn, and have shown that their deductions are incorrect. No care whatever has been taken to separate the operation as a cause of death from the disease which demanded the interference; and they very justly argue that if the obstetric surgeon was forced to open the head to hasten delivery in a case of rupture of the uterus, and the woman died, she perished not from the operation, but in spite of it. It is very certain, therefore, that we must not compare the actual results of this mode of interference with the usually accepted statements.

* *System of Midwifery.* 8vo. Phila., 1862. P. 372.

† "The Abolition of Craniotomy from Obstetric Practice, etc." *Trans. Obstet. Soc. of London.* Vol. i. p. 21.

‡ *Principles and Practice of Obstetrics.* 4to. Phila., 1866. P. 271.

§ Dr. J. M. Duncan. *Mortality of Childbed and Maternity Hospitals.* 8vo. New-York, 1871. P. 24.

|| *Trans. Obstet. Soc. of London.* Vol. xiii. p. 55.

The mortality from craniotomy varies greatly with the degree of deformity of the pelvis. In cases where the contraction is moderate, when delivery can be effected by simply evacuating the brain and extracting, the operation is one of the most simple and easily performed in obstetric surgery. Indeed, it is so simple that the difficulty is, not to operate, but to avoid operating. This is by no means to be compared with such cases as the one which has been put upon record in this paper, either in the difficulty in its performance, or the dangers to the mother. The former sinks into utter insignificance before the latter; and we do not fear contradiction when we say that, so far as the operator is concerned, Cæsarean section is much more easily done than craniotomy, when the antero-posterior diameter of the superior strait is two inches or below it. The mortality from craniotomy in moderately contracted pelves is not to be compared with that in cases in which the conjugate diameter is below two and a half inches. Until these distinctions are made, until other causes of death as the accidents of labor are eliminated, and until we cease to include these terribly grave embryulcia operations, with those less difficult ones which even the inexperienced can perform without trouble, we cannot make a comparison between the dangers of embryotomy and the Cæsarean operation.

During the past few years, the whole attention of obstetricians has been given to the perfection of means to avoid the latter operation, and to improving that of embryotomy. The invention of the cephalotribe is certainly a most important advance in obstetric surgery, but it may be gravely questioned whether the advan-

tages of the instrument have not been much overrated. Hemming has pointed out the fact that out of two hundred women upon whom cephalotripsy had been performed,* 39 died—a mortality of $19\frac{1}{2}$ per cent. These cases seem to have been unselected. Jones† states that in the Hospital of the Clinique, at Paris, during three years—1857, 1858, and 1859—24 women were operated upon, 7 of whom died—a mortality of over 25 per cent. In eight of these patients, the conjugate diameter was below $2\frac{1}{2}$ inches, and five of the fatal cases were among these women, showing most conclusively that in pelves with a conjugate less than that mentioned, the operation is very serious indeed—ay, so serious that the prognosis is almost too grave to contemplate. It is, indeed, a poor prospect of recovery which our art has to offer the mother when the chances are evenly balanced against her.

This fact may well lead us to consider whether craniotomy and its modification, cephalotripsy, is the best method of delivery in pelves with a conjugate diameter of two inches or less. The tendency in recent times has been to improve the cephalotribe to such an extent as to abolish the Cæsarean section from the operations of the obstetric surgeon. This important improvement in our instrumental appliances, in conjunction with the induction of premature labor, has given new facilities for dealing with these cases, and will enable obstetric surgeons to avoid the terrible resort of Cæsarean section in many instances. But there is a space through which

* Cazeaux's Treatise on Midwifery. 8vo. Phila., 1869. P. 1054.

† The Management of Labor in Contracted Pelvis. 8vo. London, 1865.

even a mutilated foetus will not pass. The celebrated case of Elizabeth Sherwood* has proved that this is very small. Much more important is it to determine the space through which a dead child can be drawn with comparative safety to the mother, for the exceptional and desperate cases upon record are exceptions to, rather than examples of the rule.

We are willing to grant what we believe to be perfectly true, that no obstetric surgeon should resort to Cæsarean section rather than craniotomy or cephalotripsy, when he has more than two inches in the conjugate and three in the transverse diameter of the superior strait. Hodge says:† “If, however, the contraction of the short diameter of the pelvis be two inches or under, then, as we have already mentioned, the Cæsarean operation is to be performed, as affording a better prospect for the mother.” Yet it must be remembered that this eminent man, whose opinion is entitled to the more respect because it was deliberately expressed as the conclusion derived from an experience of forty years, was fully convinced of the virtues of the cephalotribe, and himself modified the instrument in several important particulars. Even Cazeaux—than whom none, more eloquently mourns the slender hopes we can afford the mother under the circumstances—says‡ that we should prefer Cæsarean section to craniotomy when the conjugate is $2\frac{1}{8}$ inches and the child is alive. Greenhalgh,§ in an able article

* Osborne. *Practice of Midwifery*. 8vo. London, 1795

† *Princ. and Pract. of Obstetrics*. 4to. Philadelphia, 1866. P. 276

‡ *Theoret. and Pract. Midwifery*. 8vo. Philadelphia, 1869.

§ *Trans. Obstet. Soc. London*. Vol. vii. p. 285.

upon the comparative merits of the Cæsarean section and craniotomy, expresses the following opinion: "I feel confident that the most sceptical must admit that the mortality to the mother is as great, if not greater, from craniotomy, in *extreme* distortion of the pelvis, as in the Cæsarean section." This opinion is certainly supported by this writer's own experience; for of six women with pelves the conjugate diameter of which did not exceed two inches and a half, five died between two, four, and seven days after delivery.* In consequence of this sad experience, he boldly says, "Nothing would induce me again, even under the most favorable circumstances, to attempt delivery by the crotchet, when the conjugate (true) diameter of the brim does not fully measure two inches exclusive of the soft parts." It is not our purpose to fill this essay with quotations from various authorities, or else the citation of opinions confirming those already quoted could be indefinitely prolonged; but based, as they are, upon imperfect data and poorly analyzed statistics, they add but little additional force to the statements of Hodge, Cazeaux, and Greenhalgh. We cannot, however, forget the important declaration of Burns, "It is one thing to extract, and another to extract safely in extreme deformity."

On the other hand, it must not be forgotten that the advocates of craniotomy and cephalotripsy—we include them both under one head—claim that delivery can be effected, in extreme deformity, by that method more safely than by Cæsarean section. Pajot, of Paris, con-

* Trans. Obstet. Soc. London. Vol. vii. p. 284.

tends for the cephalotribe in a conjugate diameter of one inch and a quarter, and Barnes believes that with an inch and a half "the risk to the mother is inconsiderable compared with that attending the Cæsarean section."^{*}

Braxton Hicks, who has probably produced the best cephalotribe now in the hands of the profession, has delivered through an inch and three quarters, and evidently believes that the range of utility of the instrument is considerably below this.

If we attempt to harmonize these diverse opinions, several very important facts must be taken into consideration. Although not the country in which cephalotripsy was revived—for this honor belongs to France and to Baudelocque—it is a noticeable fact that the strongest advocates of the instruments and the bitterest opponents of Cæsarean section are the English accoucheurs, who have resorted to the latter operation the least frequently and under the most desperate circumstances. It must not be forgotten that much of the statistical information which we possess of the mortality of both of these operations is utterly unreliable. Errors in regard to craniotomy are particularly glaring, as Hicks and Phillips have shown. It is entirely out of place to include all embryulcia operations under one head—as we said before, to compare the operation in a conjugate of 1.50 or 2.00 with that in 3, or 3.50—the one a procedure which is terrible in its details, the other a comparatively trivial process. It would be just as reasonable for surgeons to

[* Obstetrical Operations. 8vo. New-York, 1870. P. 268.

include all amputations of the lower extremity under one head. This is manifestly erroneous, for the mortality following amputation above the knee exceeds that of the operation performed below that joint; while the sad records of coxo-femoral disarticulations show that this is but a poor triumph for our surgical brethren. As we approach the centre of the body, in operations on the extremities, the mortality increases. As the conjugate diameter of the pelvis diminishes, so does the operation of craniotomy become more difficult and dangerous.

There is another reason why it is not proper to include all craniotomy operations in one category. In the recorded cases, perforation has been resorted to at very different periods in the course of the labor—sometimes at its commencement, when the woman was strong and cheerful; sometimes at the end, when she was exhausted and weak, and when the operation was an almost forlorn hope. These two classes of cases are constantly included under one head, and constantly compared with one another. It is as unreasonable as for a surgeon to estimate the mortality of amputations of the lower extremities by noting the number of deaths which follow the removal of the part in neglected cases, in which the proper time for operating has been allowed to pass, and the patient is exhausted and close to the narrow line which separates time and eternity. It is no use to argue that these cases are not parallel. As the skilful surgeon will anticipate the dangers of a case, and operate before his patient is exhausted by hemorrhages or prolonged discharges, so will the good obstetrician foresee the evil that is afar off, and in a vast majority of instances be enabled to perform em-

bryotomy before his patient has been too much prostrated by ineffectual efforts to deliver herself.

Exactly the same remarks apply most forcibly to Cæsarean section. This operation is opposed by most English surgeons and accoucheurs, and it is indeed a dark record which they present to the professional world. Ramsbotham says,* that "out of at least fifty operations performed in the British Isles, there were only five instances of recovery, a mortality of 90 per cent." This statement nearly agrees with that of Dr. Playfair,† made in 1865, that only 11 per cent of the patients survived the operation in Great Britain. But the most reliable and important British statistics of this operation are those contained in the elaborate papers‡ of Dr. Radford, of Manchester. He has collected 98 cases, of which 82 or 83.67 per cent died, and 16 or 16.33 per cent recovered. This is truly but a poor record for British obstetric surgery, and removes any surprise which we may have felt at the attempts of their accoucheurs to improve the cephalotribe. But it is somewhat startling to learn that the operation has been much less successful in that country than it has on the Continent. M. Dufellay§ has shown that many more may be saved, and that if the Cæsarean operation be performed early and before the woman has become exhausted, only 19 per cent die, and 81 per cent recover. This conclusion is based upon an analysis of all the cases which occurred between the

* System of Obstetrics. Philadelphia, 1865. P. 309.

† Trans. Obstet. Soc. Vol. vii. p. 288.

‡ Observations on the Cæsarean Section. 8vo. Manchester, 1865; and, Further Observations on the Cæsarean Section. 8vo. Manchester, 1868.

§ Archives Générales de Méd. 1861.

years 1845 and 1861. Dr. Harris* criticises his statements because these were not all cases of gastro-hysterotomy, as that writer calls the Cæsarean operation, but were some of them instances of abdominal section for the removal of a fetus which had escaped into that cavity through a ruptured uterus. It is true that the uterus is not incised in these instances; but we cannot think that this fact vitiates the conclusions of M. Dufiellay, since this would probably be more unfavorable than the Cæsarean operation when performed at a proper time, and before the woman was exhausted. This would appear to be true, for the destruction of the continuity of the uterine tissues by rupture would probably be less favorable than by the knife, while this accident would be likely to occur in women who had been in labor for a long time, and who were, therefore, exhausted by its pains and anxieties. Another reason why this view appears to be correct is, that in rupture the fetus and some blood are extruded into the abdominal cavity, one of which is entirely, and the other in a great measure avoided in gastro-hysterotomy. In cases of rupture, of the uterus requiring abdominal section, we would expect the mortality to be greater than after the Cæsarean operation when performed early and at a selected time, for the reason that the shock in the former is much greater than in the latter. In the former there are two wounds—the first occurring under the worst possible circumstances, and the second made by the surgeon as the *dernier* resort, to rescue his hopeless patient from the very jaws of death. In

* Amer. Jour. Obstet., Nov. 1871. P. 427.

view of these facts, it is therefore improbable that the association of these two classes of cases has made the mortality from gastro-hysterotomy appear more favorable than it really is. If these results appear doubtful, however, let us take the less favorable experience of operators in the United States as a guide. Dr. Harris, in his elaborate memoir upon this subject, writes:* "If we calculate the risks of gastro-hysterotomy in this country, from cases operated on in cities and large towns, or by their surgeons in their immediate vicinity—giving them all the advantages that skill and service can command—we find that 60 per cent of the women recovered." Dr. Harris, in his second paper † on Cæsarean section in this country, publishes a table of 17 cases in which the operation was performed during or at the close of the first day of labor. Among these the mortality was less, $70\frac{10}{13}$ per cent of the women recovering. This, it may be assumed, is nearer the truth than the other result, and is about 10 per cent higher than the estimated death-rate of M. Dufiellay. This being the case, the operation is deprived of many of its horrors, while the eloquent words of some of the advocates of cephalotripsy become but "sounding brass and tinkling cymbal." It cannot be denied that Dr. Barnes attempts to throw doubt upon the inferences drawn from statistics, and particularly alludes to those of M. Pihan-Dufiellay, and asks, ‡ "What assurance have we that an undue proportion of successful cases are not recorded, unsuc-

* Amer. Jour. of Obstetrics, November, 1871, p. 436.

† Amer. Jour. Obstetrics, Feb. 1872, p. 662.

‡ Obstetric Operations. 8vo. New-York, 1870. P. 279.

cessful ones remaining in the dark?" This, however, is little less than a tacit acknowledgment of the weakness of his position, and we now ask him how he will reply to the plain statements, and bare, bold facts recorded in Dr. Harris's papers, since he has spent months and even years in their collection, and since he expressly says, * "My experience has taught me that, in this country at least, the publication or withholding of cases has been very little influenced by favorable or unfavorable results, so far as the operation in question is concerned." He then states, "I have had more trouble in searching and obtaining abstracts of favorable cases than their opposites." In addition, we would ask the advocates of cephalotripsy what proof they have to furnish that records of unfavorable cases of delivery with that instrument are not hidden in mouldy note-books? The suggestion comes with as good grace from one side as the other. Barnes says, † "Obviously we cannot recognize fatal cases of craniotomy in extreme deformity, say of a conjugate diameter reduced to 2'' or 1.75'', unless the operation was begun under selected circumstances—that is, before exhaustion had set in—and conducted with due care and after the most approved methods." Obviously the same is true of the Cesarean operation, and it is the very principle for which we have been contending through all these pages. It may be as fairly applied upon one side as the other.

The time has not long passed since wounds of the peritoneum were looked upon with the utmost dread

* Loc. cit., p. 422.

† *Obstetric Operations.* London, 1871. P. 314.

by surgeons, but now they are made every day; and it is interesting to note a fact to which Dr. Playfair* has drawn attention, that the results of M. Pihan-Dufiel-lay's investigations give about the same mortality from Cæsarean section as from ovariectomy. In the American cases, tabulated by Dr. Harris, and in which all but cases of true gastro-hysterotomy were excluded, the death-rate is higher; but it is a noticeable fact that in Dr. Harris's second table, the estimated mortality really due to the operation is about 29 per cent, or about 4 per cent higher than that of ovariectomy. It may be urged that we should not compare these two operations, for in one instance we have the woman in the puerperal, and the other in the non-puerperal condition. This position is hardly correct, and a comparison of the two conditions will probably show that the puerperal is an equally favorable one for bearing an operation, because, though close to the border-land which divides health from disease, it is purely physiological in its character. On the other hand, the operation of ovariectomy is rendered necessary by a purely morbid process, and it is too often performed as the last resort. It may be urged that in gastro-hysterotomy two incisions are made—one through the abdominal wall, the other through an important internal organ—the uterus, and that therefore the operation will be found more dangerous than ovariectomy. But it is not to be forgotten that in the latter the pedicle is severed, a wound also internal in its situation, and that, in addition to this, extensive adhesions often have to be

* Obstet. Soc. Trans. Vol. vii. p. 288.

broken up, thus adding much to the dangers of the procedure. Yet with all this, 75 per cent of the women recover—certainly one of the proudest triumphs of the art and science of surgery. With this achievement before us, and the recollection that when first performed ovariectomy was a very fatal operation, we have every reason to believe that, with proper care, the Cæsarean section will be just as successful, and that from 75 to 80 per cent of the women operated on will recover.

In order to appreciate truly the comparative merits of the cephalotribe and Cæsarean section, it will be necessary to study the dangers of craniotomy and the mechanism of the action of the cephalotribe. Barnes* says that of the former there are five.

1. The perforator may strike the promontory of the sacrum.

2. Spiculæ of bones may lacerate the soft parts of the mother.

3. The crotchet may slip and lacerate the mother.

4. The operation may be deferred too long.

5. Long-continued pressure may cause mortification and sloughing of the mother's soft parts.

Of these dangers three at least may be excluded, for we are now supposing that the patient has every opportunity that skill and attention can give her; and though the error may be easily committed, it is not to be supposed that an experienced accoucheur will thrust his perforator into the promontory of the sacrum for the fetal head. Such a man would also so carefully guard his crotchet that his own hand would be lacerated rather

* *Obstet. Operations.* 8vo. London, 1871.

than the mother's tissues, if it slipped. We are supposing, too, that the operation would not be deferred too long, and that the woman would not have become exhausted before an attempt was made to deliver.

But spiculæ of bone may wound the mother's soft parts. This is particularly liable to occur in just those labors which we are considering, in which there is extreme pelvic deformity. It is alleged that this can be prevented by the cephalotribe, but it is very doubtful whether this can be more effectually prevented by that instrument than by the fingers of the operator when they are properly used. Theoretically, it would appear as if the cephalotribe would push the bones through the scalp when forcible compression is used; but Professor Hodge has especially investigated* this matter, and proved that the opinion has no foundation in fact.

The writer conceives that a much more important point for consideration is the effect of pressure upon the soft parts of the mother. Every experienced accoucheur knows that the puerperal woman will bear an incredible amount of pressure upon the sensitive and delicate tissues of the genital passage during labor, and that the recovery from this is often surprisingly perfect. He is as thoroughly aware that there is a limit beyond which endurance ceases, when the effects of it, if they do not involve her life, may completely destroy her comfort and happiness.

In those cases of extreme pelvic deformity in which the operator is taken at a disadvantage, the dangers of

* System of Obstetrics. 4to. Phila. 1844. P. 277.

sloughing of the cervix uteri, the vagina, and bladder are increased just in proportion to the diminution of the pelvic passages, and in proportion to the delay in delivery. But if delivery is to be effected by the crotchet, the embryulcia forceps, and the cranioclast, it is not difficult to see that these dangers are greatly increased, for the diminution in the size of the foetal head is effected by dragging that structure downward against the mother's soft parts, supported by the bony pelvis, and making a fulcrum of these to enable the obstetric surgeon to twist the bones off.

Will the cephalotribe remedy this difficulty? In answering this question, it must be remembered that in the ovate and reniform pelvis, which is the variety of deformity in which we are most frequently called upon to deliver, in extreme cases, the blades of the instrument have to be passed at the sides of the pelvis, or in the transverse diameter. They consequently diminish the head in just that direction in which there is the most room, while through compensation its size is increased in the opposite direction, or that in which there is the least room and where there is the most danger from pressure. Hence, we are told to turn the instrument about in the cavity of the pelvis and to crush the head in the other direction. Pajot even performs a sort of lithotritry operation upon the foetal cranium,* crushing from two to four times, at intervals of as many hours, and then extracting. Such suggestions may be very well with an antero-posterior diameter of over two inches and a half, but in our own case such a proceeding was impossible.

* Arch. Générales de Méd., May, 1863.

The blades of the cephalotribe could only be put in one way, and even then not until a considerable part of the foetal skull had been broken off and removed by Meigs's embryulcia forceps. After the introduction of the first blade, there was not sufficient room on the right side of the pelvis to allow its fellow to pass between the head and the brim, and hence it was not until a considerable part of the difficulty had been overcome that the instrument could be utilized.

In cases of this kind, the question to be solved is the delivery of the base of the skull through the contracted brim. In the delivery of his famous patient, Elizabeth Sherwood, Osborne* got the first glimpse of the principle by which this was to be effected, though it remained for his successors to fairly and fully elucidate it. Can you be certain that the cephalotribe has crushed and destroyed the base? Von Weber,† in experimenting on the heads of dead children, found that while the bones of the base may break, fractures are less common than simple bending of the bones inward, or turning upon themselves. Braxton Hicks makes the same statement,‡ and in a subsequent paper adds§ that "the reduction of the base . . . is a matter of great difficulty, and requires great power in the instrument." This consideration led Von Weber to conclude, that the most important action of the cephalotribe is that of a powerful tractor. Barnes|| says that it may be made to partly crush the base, and evidently takes

* Practice of Midwifery. 8vo. London, 1795.

† Quoted by Lusk, Med. and Surg. Reporter, June 8th, 1867.

‡ Trans. Obstet. Soc. London, 1870. P. 3.

§ Trans. Obstet. Soc. London. Vol. xi. p. 47.

|| Obstet. Operations. 8vo. London, 1871. P. 301.

what is the correct view of the powers of the cephalotribe—that it is useful rather to break up the perforated cranium than to diminish the size of the base, while its use as a tractor is a secondary consideration. In 1867, Braxton Hicks said plainly,* the instrument “is not a tractor; and therefore, should pains be absent, we shall generally have to draw down the head by some other means.” The same authority had previously insisted† upon the importance of bringing down the base edgewise, with the chin foremost and in front, in delivery through extremely contracted brims. Three years later,‡ and again in 1870,§ and after he had modified the cephalotribe, he reasserted this doctrine, distinctly stating that the instrument is intended to crush the cranium, so that the base can be brought through edgewise. Hicks|| plainly asserts that it is intended to compete with the crotchet and craniotomy forceps, and not with Cæsarean section. In this way, and for this purpose, the instrument becomes a very valuable one, and in cases of moderate deformity will enable the obstetrician to effect delivery within a short time; for in these cases the vault has to be crushed, when, by turning the head of the child within the cephalotribe so as to adapt its new dimensions to the pelvic brim, and using the instrument as a tractor, the fœtus will easily come through. But the matter is very different in narrow pelves below two inches; and, so far as my own case is of value, it has gone to show me

* Brit. Med. Jour., Oct. 19th, 1867.

† Trans. Obstet. Soc. London, 1864. Vol. vi. p. 263.

‡ Brit. Med. Jour., Oct. 19th, 1867.

§ Trans. Obstet. Soc. London, 1870. P. 3.

|| Brit. Med. Jour. Oct. 19th, 1867, and Trans. Obstet. Soc. 1870, p. 3.

that the cephalotribe will not supplant the cranioclast. In this woman, after the vault of the cranium was broken away and the face turned downward, the crotchet was still ineffectual. At this juncture one blade of the cranioclast was applied beneath the lower jaw, and the other thrust up into the concave surface of the base of the skull, after which strong compression was made and the whole face crushed in the instrument, decomposing the supra-maxillary arch and forcing the eyes from the orbits. This, I conceive, may be an important application of the instrument when the face has been brought down in narrow pelves. If this has been effected, the cranioclast can nearly always be applied in this way. The concavity of the base of the skull secures a position for one blade of the instrument, where it can directly harm none of the mother's tissues, while if its fellow cannot be thrust between the lower jaw and the pelvic wall, it can be passed into the child's mouth. In this way, the vault of the cranium being removed, the vertical diameter of the face, which is ordinarily an inch and a half, can be reduced to an inch or even less. Certainly no accoucheur can desire more than this; for if it were necessary to reduce the fœtal head still further, the pelvis would be so small that he could not operate through it. As a tractor under these circumstances, nothing could be more satisfactory than the cranioclast, and its place cannot be taken by the cephalotribe either for safety or efficiency.

The great virtue of the latter instrument is, that it enables us to get rid of the vault of the cranium quickly.

We have been treating delivery, thus far, as a mere mechanical problem. Such it is, and the accoucheur has to determine how he can bring a body of a given size through an unyielding curved canal with definite diameters; but it is totally unlike the problem which Hull and Osborne tried to solve by dragging dead children through orifices having the shape of contracted pelves, and made in unyielding boards. In the human female, it is never to be forgotten, that to this physical there is added a vital element, and that the accoucheur has to consider how much pressure the delicate and sensitive tissues in the pelvis and lining the genital passages will bear. Barnes says* most forcibly, that were this problem given an engineer to solve, he would soon devise means to bring a body the size and shape of the fetal head through a chink from an inch and a quarter to an inch and a half wide. This solution had been furnished and acted upon before Barnes published a single line of his book—furnished by the accoucheur himself, it is to be feared, to the serious detriment of his patient; for this is not a question in engineering, but one which involves human life and the protection of important and delicate organs and tissues. Hence the question has to be solved, not in the laboratory or mechanic's workshop, but at the bedside of suffering woman, when she is performing her highest and most delicate function.

In 1829, on the sixth day of June, Baudelocque the nephew asserted before the *Institut Royal de France*, that, during the preceding sixteen and a half years, one half of the mothers delivered by craniotomy in the Maternité at Paris had died. Then and there, to avoid

* *Obstet. Operations.* London, 1871.

this fearful loss of human life, he proposed to revive the use of the cephalotribe of Assalini, and furnished a modification of it. That this instrument has received the attention which it merited, is proved by the fact that at the exhibition of the London Obstetrical Society, held in 1866, no less than seventeen different forms of the instrument were exhibited, while Hodge's,* and probably some others, were not shown. At the bedside it has been used in many a trying moment, and while English authorities laud it highly, our previous citations show that American and Continental writers assign it a more limited application.

Among the most recent observations which give us actual information of the clinical uses of the cephalotribe, are those of Dr. Karl Rokitansky.† These are peculiarly valuable, because this gentleman is the assistant of Professor Braun; and, besides having unusual opportunities for observation, has had the advantage of the counsel and experience of that eminent obstetrician, and may be fairly assumed to have had predilections in favor of the instrument. Of 103 cases of craniotomy coming under the observation of Rokitansky, 41, or about 40 per cent, terminated fatally. Speaking of the comparative merits of the cranioclast and the cephalotribe, he says, "In Professor Braun's clinic a much greater number of unfavorable cases had been treated by the cranioclast than by the cephalotribe, and yet the results of the

* Kidd. Dublin Quart. Journ. Med. Sci., Feb. 22, 1867, p. 4; and Catalogue of Instruments, &c. Pub. by London Obstet. Soc. 1867.

† Wiener Medizinische Presse. 8-19, 1870; and Ranking's Abstract, Jan. 1872. P. 225.

former instrument were in every respect superior. . . . With regard to the cranioclast, which, in truth, is nothing more than an extraction instrument, it may be asserted that its application, which can be made in every diameter of the pelvis, is never attended with that severe pain which is so often caused by the introduction of the cephalotribe." Of the nine cases of labor which Jones* observed in Paris, and in which the conjugate diameter was two and a half inches or less, eight were delivered by decomposing the head, and one by Cæsarean section. Of the eight women delivered by perforation and cephalotripsy six died—a mortality of sixty-six per cent. Dr. Jones adds: "If we consider that the total mortality of mothers and children is fourteen out of eighteen, we are led to deplore the impotency of obstetrical art in cases of this description." These facts led this author to assert "that cephalotripsy, when performed in a very narrow pelvis, is, notwithstanding the sacrifice of the child, a very murderous operation for the mother."

Some of these cases forcibly illustrate the difficulties which may be met with in the use of the cephalotribe. In one instance,† where the conjugate diameter was two and a half inches, M. Dubois perforated, but could not bring the head down. This was at four p.m. At half past five, two fruitless efforts were made to grasp the head. The instrument was tried again at seven a.m. on the succeeding day, without effecting delivery, when version was performed, but the foetus could not be extracted. After this time the woman was practically

* *The Management of Labor in contracted Pelvis.* 8vo. London, 1867. P. 35.

† *Ibid.* p. 53.

abandoned; but finally M. Dubois' assistant withdrew the child, which weighed only five and a half pounds, about the middle of the afternoon, just as the poor woman expired. This, indeed, is a sad commentary upon the usefulness of the cephalotribe, especially when we remember that the operation was done at the Hospital La Clinique, in Paris; when we remember that the instrument was in the hands of M. Dubois; when the woman's pelvis, as proved after death, was two and a half inches in the conjugate; and when the additional fact is stated that the labor began at ten P.M. on the 15th, and the operation was commenced at four P.M. on the 16th.

In another case, the woman, with a conjugate of two and a quarter, came under M. Dubois' care at ten A.M., when he perforated. Some time afterward, he attempted to apply the cephalotribe, when he could not catch the head, Dr. Jones says, because, "placed completely above the brim, it rolled under the pressure of the forceps, and escaped from the teeth of the instrument." Other unsuccessful attempts were made, and the delivery was abandoned till the next morning at nine A.M., when the contractions of the uterus had forced the head downward into the brim, and labor was terminated with the instrument at that time. The poor woman perished at six the same evening. The testimony in regard to the working of the instrument in these cases is very important, and certainly but poorly supports its utility in a conjugate of two and a half inches or less. The fact that so skilful an operator as M. Dubois repeatedly failed in grasping the head—that in one case, with a

conjugate of two and a half, he practically abandoned the woman after manipulations extending over seventeen hours, and that his unfortunate patient died some five hours after it, just as his assistant drew away the foetus, needs no commentary from us.

In Mr. Dubois' hands a smaller diameter than two and a quarter seems to have been an unsurpassable obstacle to delivery. In a case in which the conjugate measured only one and a half inches, he made four unsuccessful attempts to apply the cephalotribe, then abandoned her for several hours; made three attempts at delivery with the cephalotribe; failed signally, and the woman died undelivered a few hours afterward. The force of this fact will not be increased by any remarks. It teaches but too plainly its own dark, sad lesson. The autopsy showed the source of the difficulty. The vault of the cranium was broken away, but a great part of the base was found intact, and this was too large to pass the contracted brim. Certainly these cases do not speak well for the cephalotribe; but, on the contrary, carry with them most convincing proof that it is difficult to manage, and uncertain in its action. Yet these operations were done in the home of Baudelocque, the reviver of the instrument of Assilini. It must not be forgotten, however, that the French cephalotribe is much larger than either the English or the American instrument, and that, although M. Pajot says that delivery should be effected by it, and Cæsarean section excluded in women having a conjugate of one and a quarter or more, its application must be difficult, and its range of usefulness narrow, when compared with our own and the British cephalo-

tribes. But even when we give this its full measure of importance, we must admit that we have no clinical evidence that the cephalotribe is less dangerous than Cæsarean section in pelves with a conjugate diameter of $2\frac{1}{2}$ inches or less. The few successful cases reported by Barnes and Hicks, of Great Britain, are insufficient to afford conclusive evidence that this instrument is equal to the cranioclast; while the observations of Jones and Rokitansky are decidedly in opposition to such a conclusion, and those of the former indicate that at least M. Dubois would have done well to have brought the children into the world by gastro-hysterotomy rather than by cephalotripsy.

If we now turn to the recorded histories of craniotomy and cephalotripsy that are to be found scattered here and there in periodical medical literature, we will be forced to conclude that perforation and breaking up of the fœtus is not more successful than Cæsarean section in pelves with a conjugate $2\frac{1}{2}$ inches or less. Much difficulty has been experienced in the collection of these cases. In the first place, the number upon record is not large; at least the number is not large which may be used for statistical purposes, on account of the want of accuracy in the records.

We have collected, from various sources, seventy cases, of which a tabular statement is appended. Of these, thirty-three, or 61.43 per cent, recovered, and twenty-seven, or 38.57 per cent, died. If we compare these results with those of Cæsarean section as performed in America, and tabulated by Dr. Harris, we find they are inferior for according to that authority, $70\frac{1}{3}$ per cent of those

operated on "during or at the close of the first day of labor" were saved, and $26\frac{3}{4}$ per cent lost—a recovery of 10 per cent in favor of Cæsarean section, when properly performed and before the woman is exhausted. The death-rate of craniotomy appears still more unfavorable when compared with that of the cases collected by M. Dufellay, but it is much less than that which has followed the operation of gastro-hysterotomy in Great Britain, which, according to Radford, is 83.67 per cent. But we must protest against the last being accepted as the true mortality. Indeed, Radford, who is a warm supporter of the Cæsarean operation, does this himself.

Some may marvel that no more than seventy cases of craniotomy have been tabulated, and indeed the number seems exceedingly small. Great difficulty has been experienced in finding these. The number of Cæsarean operations upon record is large enough. It is probable that nearly ten times as many instances of this operation as of craniotomy in pelves with a conjugate of $2\frac{1}{2}$ inches or less are upon record ! *

* In order to collect reliable statistics upon this subject, the writer addressed a circular letter containing the following questions to many of the prominent practitioners throughout the United States. He would be thankful to receive the record of any case in which delivery was effected or attempted by craniotomy, and in which the pelvis was not larger than that mentioned.

1. Age?
2. Number of pregnancy?
3. Cause of pelvic deformity? (Mollities Ossium?
Rachitis?
4. The diameters of the pelvis?
5. The presentation and position?
6. Duration of labor?

Some may be disposed to question the justice of including certain cases in this table, in which delivery was finally effected by the Cæsarean operation. None appeal more strongly than these for a careful consideration of the comparative merits of the two methods of delivery. In all of these, craniotomy was previously tried and failed. This occurred in at least six of the seventy cases tabulated, and as the histories of these, with possibly one exception, prove that every effort was made to terminate labor in this way, they may very properly be included in estimating the mortality of craniotomy. One of these histories is peculiarly instructive, (case 18;) for Dr. Dyce bears the very important testimony that he attempted to deliver by bringing the face down, and failed.

It is to be hoped that the fact that in these pages this question has been considered purely as a scientific problem, and only as it relates to the mother, has not passed unnoticed. Until this moment the child has not been mentioned except in quotation. This is in accordance with the generally accepted doctrine that the mother's is the more valuable life. Questions in religion, morals, and political economy have not weighed with us in

- a.* Before rupture of the membranes?
- b.* Before perforation?
- c.* After perforation?
- 7. Instruments employed?
 - a.* Was the cranioclast used?
 - b.* Was the cephalotribe used, and if so, whose?
- 8. What was the result of the case?
- 9. If fatal, what was the cause of death?
- 10. If not fatal, was the recovery perfect?
- 11. Remarks.

these remarks ; and therefore the case of Cæsareanists becomes much stronger. If we remember that in the seventy cases included in the appended table, only thirty-three out of one hundred and forty lives were saved, the truth becomes almost too horrible to contemplate.

In conclusion, if we accept the premises laid down as true, we are justified in drawing the following deductions :

1. If gestation has advanced to the full term and the conjugate diameter of the superior strait be two inches and a half, craniotomy affords the mother no better chance for recovery than Cæsarean section ; and that if the diameter be two inches or less, exclusive of the soft parts, it is the duty of the accoucheur to perform gastro-hysterotomy rather than craniotomy.

2. The recorded histories of cephalotripsy in such cases afford us no evidence that it will compete with the Cæsarean section in safety, while French and German experience seems to show that cranioclasm is both more safe and more efficient.

3. English accoucheurs, who are the firmest supporters of cephalotripsy, have not yet recorded a sufficient number of facts to controvert this position.

1513 Arch Street, Philadelphia.

No. of CASE, AND REPORTER.	REFERENCE.	RESULT.	DIVISIONS OF BRIM.	CAUSE OF DEATH.	LENGTH OF LABOR.	REMARKS.
1. Smellie.....	Cases and Observations in Midwifery. 8vo. London. 1766. Vol. iii. p. 13.	Recovered.	Conjugate, 2 $\frac{1}{4}$.			Delivered with the crotchet, and much force was used.
2. Hamilton.....	Pract. Observations, p. 263.	Recovered.	Conjugate, + 1 $\frac{1}{4}$.			It required so much exertion to effect delivery, that Dr. Hamilton had to be carried home on a sedan chair.
3. Osborne.....	Pract. of Midwifery, 8vo. London, 1793.	Recovered.	Conjugate, 4; transverse, 4.		Had continued nearly 8 days before perforation, and lasted nearly 2 days afterward.	The case of Elizabeth Sherwood. Perforation was effected, the child was allowed to decompose, the whole vault of the cranium was removed, and the base brought through edgewise. The thorax and abdomen were both perforated to effect delivery.
4. Clarke	London Med. Jour. 1786, quoted by Osborne.	Recovered.	Conjugate, 1 $\frac{1}{4}$.		Before perforation, 22 hours; after perforation, 16 hours.	After perforation, it was intended to leave her until the child putrefied.
5. Clarke	London Med. Jour. 1786, quoted by Osborne.	Recovered.	Conjugate, 1 $\frac{1}{4}$.		At last 3 days before perforation; about 8 hours after perforation.	Was left after perforation until the uterus moulded the head.
6. Robert Lee.....	Ch. Midwifery, 2d ed. London, 1848. P. 85.	Died.	Conjugate, 1 $\frac{1}{4}$. The tuberosities of the ischia			This is the celebrated case of Mrs. Jarvis, who, after giving birth to three children, suffered from molities ossium. In 1830, she was delivered by Dr. Lee after great difficulty, but the size of pelvis is not mentioned. In 1832, she had another long labor, and

7. Robert Lee.....	Ibid., p. 89.	Recovered.	Conjugate, 2 in.	Conjugate, 3 or 4 lines asunder.	was delivered by the crotchet in the orbits. In 1833 and 1835, premature labor was induced. The dimensions of the pelvis are not mentioned until 1836, when they were obtained at her post-mortem; but as molities ossium was the cause of the difficulty, as this is a progressive disease, as premature labor was induced at the 7th month, in Feb., 1835, when the fetus was expelled without assistance, and as Dr. Lee attempted to induce labor at the end of the sixth month, in Jan., 1836, and as he failed in effecting it until the succeeding March, it is fair to conclude that the pelvis had progressively changed.	She was subsequently delivered by premature labor.
8. Robert Lee.....	Ibid., p. 46.	Recovered.	Not mentioned, but it was very narrow.		The operation lasted five hours, and the pelvis was so narrow that the child, which was at full term, could not be drawn through. The skull would not pass until the base was entirely destroyed.	
9. Robert Lee.....	Ibid., p. 57.	Died.	Conjugate, 1½; oblique, 1½, (right.) oblique, 1½, (left.)	Suffering from molities ossium. Long labor.	Labor was induced at 6¼ months. The pains had continued for five or six days when the notes were found to present.	
10. Cox.....	Provincial Med. and Surg. Jour., vol. 8, p. 382.	Died.		Labor.	Craniotomy was tried and failed. Forced to resort to Casarean section.	
11. Keller.....	Trans. Edinburgh Obstet. Soc., 1872, vol. ii, p. 46.	Recovered.	Conjugate, under 2 inches.		Delivered with the cephalotribe.	
12.	Amer. Jour. Med. Science; Hodges's Obstetrics. 4to. Phila. 1866. P. 285.	Recovered.	Conjugate, 2.		The celebrated case of Mrs. Reybold.	
13.	Ibid.	Recovered.	Conjugate, 2.		The 2d labor of Mrs. Reybold, who was afterward safely delivered upon two occasions by the Casarean operation.	

No. of CASE, AND REPORTER.	REFERENCE.	RESULT.	DIMENSIONS OF BRIM.	CAUSE OF DEATH.	LENGTH OF LABOR.	REMARKS.
14. Murphy	Dublin Quart. Jour., Feb. 1859, p. 123, and Lancet, Apr. 3d, 1847.	Died.	Conjugate, $1\frac{1}{2}$; transverse, $4\frac{1}{2}$.	Exhaustion. There was no lesion discovered at the post-mortem to account for death.	3 days.	There was great difficulty in effecting delivery. The operation was performed at Rickmansworth. Had the patient been in London, Prof. Murphy would have performed Casarean section.
15. Shingleton	Dublin Quart. Jour., Nov. 1850, p. 287.	Died.	Brim would only allow one finger to pass.	Ruptured uterus.		The pelvis was obstructed by a tumor. It was the woman's sixth labor.
16. Henry Oldham	Med. Chir. Trans., vol. 34, p. 89.	Died.	Conjugate, 2.	Labor.	84 hours.	Mother was rickety. Labor was induced at the 7th month. The cranium was entirely, and the base partly broken up, when the right hand and foot were found in the brim. They could not be brought down and the operation of Casarean section was performed.
17. Humphry	Asso. Med. Jour., vol. IV., 1856, p. 779.	Died.		Labor.		Craniotomy was tried and failed. She lived two hours after it.
18. Robert Dyce	Edinburgh Medical Jour., vol. vii. p. 885.	Died.	Conjugate, 2 in.	Labor.	4 to 5 days.	Craniotomy was performed. All the cranium and even a part of the base were broken down. Tried to bring the face down and failed. Forced to resort to Casarean section to effect delivery. Lived 43 hours afterward.
19. Ramsbotham	Med. Times and Gazette, July 5th, 1862, p. 6.	Recovered.	Conjugate, 2 in.			Delivery effected by destroying the vault of the cranium and bringing the face downward.
20. Ramsbotham	Ibid., Aug. 23d, 1862.	Recovered.	$1\frac{1}{2}$ on the left side.			The obstruction was due to a pelvic tumor.
21. Ramsbotham	Ibid., Sept. 6th, 1862.	Recovered.	Conjugate, $2\frac{1}{2}$.			Took only an hour to deliver.

22. Pajot	Gaz. des Hôp. Jan. 1862.	Recovered.	Conjugate, 1 $\frac{7}{8}$ in.				
23. Johnson	Lancet, Nov. 1st, 1863.	Died.	Conjugate, 2 $\frac{3}{4}$.	Labor.			Craniotomy was tried and failed to deliver. Recorted to Cesarean section.
24. Murphy	Dahl, Quarterly Jour., May, 1861.	Died.	Conjugate, 2 $\frac{1}{4}$.				Had bronchitis when admitted, but it was mild.
25. Murphy	Ibid., May, 1864.	Died.	Conjugate, 2 1-5.	Exhaustion.	Total, 72 hours; after perforation, 4 hours.		In this and the previous case Dr. Murphy resorted to craniotomy rather than Cesarean section because the child was dead.
26. Makenzie	Trans. Obstet. Soc. London, vol. 1. p. 207.	Died.	Conjugate, 2 $\frac{3}{4}$; transverse, 5 $\frac{1}{4}$.	Fatigue and shock.			Craniotomy was commenced as soon as os was dilated. Delivered by craniotomy forceps. Cephalotribe was not used.
27. Hicks	Ibid., vol. vi. p. 292.	Recovered.	Conjugate, 2 $\frac{3}{4}$.				
28. Hicks	Ibid., p. 294.	Recovered.	Conjugate, 2 $\frac{3}{4}$.				
29. Hicks	Ibid., p. 296.	Died.	Conjugate, 2 $\frac{1}{4}$.	Exhaustion, and delay in operating.			Had been in labor 24 hours before Dr. Hicks saw her. Was delivered by perforating and bringing the face downward.
30. Hicks	Ibid., p. 296.	Recovered.	Conjugate, about 2 in.				Pelvis was obstructed by a tumor.
31. Bryce	Edinburgh Medical Jour., Aug. 1864, p. 179.	Recovered.	Conjugate, 2 $\frac{3}{4}$.		About 4 days.		Delivered with the cephalotribe.
32. Greenhalgh	Trans. Obstet. Soc., vol. vii. p. 281.	Recovered.	Conjugate, 2 $\frac{3}{4}$.				
33. Greenhalgh	Ibid., p. 282.	Died.	Conjugate, 2 $\frac{3}{4}$.	Rupture of uterus.			This was the same as the previous patient. Could not steady the head to perforate, and had to perform version. Dr. G. believed the rupture of the uterus was due to the ineffectual efforts to perforate.
34. Fanes	Ibid., vol. vii. p. 387.	Recovered.	Conjugate, 1 $\frac{1}{4}$.				

NO. OF CASE, AND REPORTER.	REFERENCE.	RESULT.	DIMIN- SIONS OF BRIM.	CAUSE OF DEATH.	LENGTH OF LABOR.	REMARKS.
35. Greenhalgh.....	Ibid., vol. vii. p. 320.	Died.	Conjugate, 1 $\frac{3}{4}$; trans- verse, 5.	Difficuly in operating. Rupture of uterus.		Failed to deliver the head by craniotomy. Had to do it by Cesarean section.
36. Kidd	Dublin Quarterly Jour., Jan. 1867, p. 334.	Recovered.	Conjugate would ad- mit two fingers.			She was 7 $\frac{1}{2}$ months pregnant and the child was putrid, and the woman was in a deplorable condition. Although Dr. Kidd does not state that the conjugate was under 2.50, his quotation from on p. 336 also shows that it was.
37. F. Bird.....	Radford. Observa- tions on Cesarean Section. Man- chester, 1803.	Died.	Conjugate, 1 $\frac{1}{4}$.			Craniotomy was tried, failed, and resorted to Cæsa- rean section.
38. A. Milne	Edinburgh Medical Jour., July, 1868.	Recovered.	Conjugate, 2 $\frac{1}{2}$.		Before per- foration, 24 hours after it, 25 minutes.	Delivered by the cephalotribe.
39. W. H. Jones.....	Management of La- bor in Contract- ed Pelvis. 8vo. London, '67. P. 57.	Recovered.	Conjugate, 2 in.		15 hours.	Breech presentation. Delivered by detrusion and cephalotripsy.
40. W. H. Jones	Ibid., p. 53.	Died.	Conjugate, 1 $\frac{1}{2}$.	Labor. Died undeliv- ered.		At full term. Had been four days in labor when ad- mitted to hospital. M. Dubois perforated with difficulty at 9 $\frac{1}{2}$ A.M., and tried four times to apply the cephalotribe and failed. At 4 P.M. applied it and tried three times without success in bringing down the head. At the autopsy a great portion of the base of the cranium was found intact.
41. W. H. Jones.....	Ibid. Table of Cases.	Recovered.	Conjugate, 2 $\frac{1}{2}$.		106 hours.	Delivered by craniotomy and cephalotripsy.
42. W. H. Jones.....	Ibid. Table.	Recovered.	Conju. 5 $\frac{1}{2}$.		20 hours.	Craniotomy and cephalotripsy.
43. W. H. Jones.....	Ibid. Table.	Recovered.	Conju. 2 $\frac{1}{2}$.		38 hours.	Craniotomy and cephalotripsy.

44. W. H. Jones.....	Ibid. Table.	Died.	Conj. 2 in.		24 hours.	Breech presentation. Detruncation and cephalotripsy.
45. W. H. Jones.....	Ibid. Table	Died.	Conjugate, 1 3/4.	Exhaustion, Arthritis of pubis.	24 hours.	Delivered by cephalotripsy repeated with traction, after Pajot.
46. W. H. Jones.....	Ibid., p. 52.	Recovered.	Conjugate, 2 1/2.		3 days, but pains not active for 2 days.	Pregnant 7 1/2 months. Version by M. Dubois after many laborious attempts. Head delivered by the cephalotribe.
47. W. H. Jones.....	Ibid., p. 53.	Died.	Conjugate, 2 1/2.	Exhaustion.	Total, 40 hours. Perfora- tion at end of 18th hour.	Full term. Died just after delivery was effected. Cephalotribe applied at 15th hour, but could not be delivered. In two hours tried again, but could not grasp the head. This was at 5 1/2 p.m. Left till 7 a.m. the next day, when M. Dubois again applied the cephalotribe in vain. Version performed. Cepha- lotribe applied to pelvis and unsuccessful attempts at traction. Traction upon feet recommended at this time, but the patient was practically abandoned.
48. W. H. Jones.....	Ibid., p. 56.	Died.	Conjugate, 2 1/4.		44 hours; about 23 after per- foration.	Full term. Perforation at 10 a.m. by M. Dubois, and left to nature for some time, when an attempt was made to crush with the cephalotribe, but could not catch the head. 8 p.m. unsuccessful attempts re- peated. The next morning at 9 a.m. the labor was terminated with the instrument. The extraction of the fœtus was attended with a discharge of fetid gas and bloody fluid of such a nature that those pre- sent "were much affected by it."
49. Radford.....	Observations on Cæsarean Sec- tion. 8vo. Man- chester, 1865. P. 48.	Died.	Conjugate, 2 1-12.	Could not effect deli- very, and the vagina ruptured.		Cause of distortion, molities ossium.
50. J. A. Byrne.....	Dublin Quart. Jour., May, 1868.	Recovered.	Conjugate, 2 1/2.		Over 41 hours.	Delivered with the cephalotribe.
51. J. H. Davis.....	Parturition and its Difficulties. Lon- don, 1865. P. 292.	Recovered.	Conjugate, 1 1/4.			Waters had escaped two days before she was seen by Dr. Davis.
52. J. A. Ransome.....	Trans. Obstetrical Soc., p. 158. Re- lated by Dr. Rad- ford.	Died.	Conjugate, 2 1/4; trans- verse, 3 1/4.	Undeliver- ed. Rup- tured ute- rus.	72 hours.	Craniotomy was tried, but delivery could not be effect- ed by it.

No. of CASE AND REPORTER.	REFERENCE.	RESULT.	DIMENSIONS OF BRIM.	CAUSE OF DEATH.	LENGTH OF LABOR.	REMARKS.
53. O. Von Franque.....	Scanzoni's Beiträ- ge, 1869. N. Syd. Soc. Bien. Ret., 1869-70, p. 418.	Died.	Conjugate, 24; trans- verse, 4.6.	Diphtheritis of vagina and ute- rus.		Delivered by the cephalotribe. Child weighed 6 pounds, and was born after "protracted proceed- ings."
54. Barnes.....	Obstetric Opera- tions, 8vo. Lon- don, 1871. Trans. Obstet. Soc., vol. xi. p. 191.	Recovered.	Conjugate, 14.			Barnes states that he used the cephalotribe with per- fect success. The mother was in St. Luke's work- house.
55. Girvin.....	Register of Phila- delphia Hospital.	Recovered.	Conjugate, 14.			Delivered with Meigs's embryulcia forceps and the cranioclast at full term.
56. Parry.....		Recovered.	Conjugate, 14.		Nearly 7 hours.	Same woman who was operated on by Dr. Girvin. Labor induced at 8 months.
57. J. G. Mitchell.....	Lancet (Amer. ed.) vol. ii, 1853, p. 369.	Recovered.	Conjugate, 2½.			Her second pregnancy.
58. John Ramsbotham.....	Pract. Observ. on Midwifery, 8vo. Phila. 1822. P. 333.	Recovered.	Conjugate, 14 to 1½.		Before per- foration, bet. 3 & 4 days after perfora- tion, 7 hrs.	
59. John Ramsbotham.....	Ibid., p. 331.	Recovered.	Conjugate, under 24.			Labor induced at 8 months.
60. A. B. Granville.....	Rep. of the Practice of Midwifery at the Westminster Dispensary, 8vo. London, 1819. P. 98.	Recovered.	Conjugate, 13½.		Before per- foration, 2 days; af- ter perfo- ration, 7½ hours.	Measurement by Merriman.
61. A. B. Granville.....	Ibid., p. 103.	Recovered.	Conjugate, under 1½.			
62. Philip Harvey, Iowa..	Private communica-	Recovered.	Conjugate,			This woman has been delivered by craniotomy five

tion to writer.	about 2 inches.				
63. Prof. W. H. Taylor, Cincinnati, O.	Recovered.	Conjugate, 2 $\frac{1}{4}$.			times—twice in Germany, once in New-York, and twice by Dr. Harvey. He writes that her recovery has always been rapid and perfect.
64. Thomas M. Logan, Sacramento, Cal.	Recovered.	Conjugate, 1 inch.			Her fourth pregnancy. Craniotomy had been performed in two other labors.
65. Prof. Fordyce Barker, New-York.	Died.	Pelvic cavity nearly filled with a bony tumor.		Was in labor 2 days under care of a midwife before seen by any physician.	Causes of deformity was mollities ossium. Her first child was born alive. The second was delivered by embryotomy.
66. Prof. Fordyce Barker, New-York.	Died.	Conjugate, less than 2 inches.		Duration of labor, 30 hours.	The operation was completed with great difficulty. Lived two days after delivery.
67. Prof. Fordyce Barker, New-York.	Died.	Cavity of pelvis filled with an osseous tumor. No diameter exceeded 1 $\frac{1}{2}$ in.		Perforation 9 hrs. after discharge of waters.	Dr. Barker desired to perform Cæsarean section in this case, at a consultation held before the commencement of labor, but craniotomy was performed.
68. Prof. Fordyce Barker, New-York.	Recovered.	Conjugate, less than 2 inches.			
69. Dr. R. P. Harris, Philadelphia, Pa.	Recovered.	Conjugate, 2 $\frac{1}{2}$.		In labor 4 days before perforation.	Operation was performed by Dr. C. D. Meigs, at the Pennsylvania Hospital, in winter of 1849-4. The "Cæsarean operation was discussed and declined by Dr. Peaco."
70. Drs. Thomas A. Downes and R. M. Girvin, Philadelphia.	Recovered.	Conjugate, 2 $\frac{1}{2}$.		Total, 17 hours.	

